



Evaluating the Impact of Remedial Education in Florida Community Colleges: A Quasi-Experimental Regression Discontinuity Design

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Remedial education, defined as coursework below college-level offered at a postsecondary institution, is a topic of considerable debate in higher education. The conceptual foundation for remedial education is straightforward—students are tested to determine whether they meet a given level of academic proficiency for college-level classes. For those who do not meet this level, deficiencies in skills are addressed through some form of supplementary instruction, most often remedial courses.

Colleges and states devote substantial resources to remediation. A recent estimate suggests that U.S. public colleges spend more than \$2 billion annually on such courses (Strong American Schools, 2008). Remediation at Florida community colleges cost \$118.3 million during the 2004-05 school year, with 53 percent of it being paid by the state (Office of Program Policy and Government Accountability [OPPAGA], 2006). Not surprisingly, many policy-makers have begun to question the need to pay for academic preparation that they believe should have already occurred in secondary school, and many states have recently introduced plans to reduce the availability of postsecondary remedial courses or to limit outlays for such courses. It is also important to recognize that remediation has high costs for students themselves. Potential earnings are lost while students attend remedial courses. And while the courses often do not qualify for college credit, they still require the payment of

tuition. Florida community college students who required remediation in the 2003-04 school year paid, on average, an additional \$504 for college preparatory coursework during their first year of college (OPPAGA, 2006, p. 4).

Meanwhile, the demand for remediation has increased in recent decades. Nationally, it is estimated that only one third of students leave high school prepared, at least minimally, for college (Greene & Foster, 2003). Of those who enter higher education, over one third are required to take remedial courses in reading, writing, or mathematics (National Center for Education Statistics, 2003). Remediation rates are particularly high at two-year community colleges, which accept virtually all persons who seek admission regardless of their academic preparedness. In fact, partly due to the belief that remedial courses can be offered for a lower cost at community colleges, at least ten states have elected to focus their remediation efforts at two-year colleges, and more consider doing so (Jenkins & Boswell, 2002).

Unfortunately, the ongoing debate about whether and where to offer remediation lacks a large knowledge base about the effectiveness of remedial courses. The study summarized in this Brief employs a quasi-experimental design to examine remedial enrollment and outcomes of community college students throughout the state of Florida. In addition, discussion in the study underscores particular challenges inherent in determining the causal impact of remediation. The study makes use of an expansive administrative dataset of nearly 100,000 community college students in Florida. This state's community college system is the third largest in the U.S., enrolling nearly six percent of community college students nationwide. Because this study focuses on Florida—one of the ten states that discourage the provision of remedial education at four-year institutions—its findings provide information that is broadly relevant to policy discussions occurring in many other states.

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Prior Research on the Effectiveness of Remediation

Little is known about the effectiveness of postsecondary remediation in improving the outcomes of underprepared students. Arguments for and against its use have been made. Advocates claim that remediation is an important component of higher education that helps students who might not otherwise be able to attend college. Critics argue that remediation is a barrier that increases the mandated prerequisites for college-level courses, thereby lowering completion and transfer probabilities. Moreover, some research suggests that placement into remediation may lower students' self-esteem and expectations, possibly because of stigmatization by peers and faculty, negatively impacting educational outcomes.

Even though 35 to 40 percent of first-time college students are placed into remediation each year, there has been little research on the issue of the effectiveness of remedial courses. Early research on remediation has been mainly descriptive, simply comparing the outcomes of students in remediation with those not in remedial courses. There are, however, inherent differences between students placed in remediation and those who are deemed ready for college-level work. Selection and enrollment policies and practices thus preclude a straightforward analysis. Until recently, few studies have been able to overcome these research challenges. In fact, two reviews of the literature on remedial education found that the bulk of remedial studies are "methodologically weak," with almost two thirds reflecting "serious methodological flaws" (Boylan & Saxon, 1999; O'Hear & MacDonald, 1995).

The availability of new data sources has made possible several recently-completed major studies on the impact of remediation. The first of these large-scale studies, by Bettinger and Long (2009), used an instrumental variable strategy that combines between-college variation in remediation placement policies and the importance of distance in college choice to estimate the causal effect of remedial courses on higher education outcomes. This sort of comparison is possible in Ohio, the target state of the analysis, because institutional policies regarding remediation differ across that state's public colleges and universities. Therefore, two students with the same characteristics face dissimilar probabilities of remediation if they attend different schools. The analysis focused on degree-seeking, traditional-age (18-to 20-years-old), full-time undergraduates who entered a public college in fall 1998. It found that remedial students at Ohio colleges were more likely to persist in college and to complete a

bachelor's degree than students with similar test scores and backgrounds who were not required to take the courses. Moreover, Bettinger and Long (2005) found that community college students placed in math remediation were 15 percent more likely to transfer to a four-year college and to take ten more credit hours than students with similar test scores and high school preparation. Overall, these results suggest that remedial courses have beneficial effects for students in Ohio.

Martorell and McFarlin (2008) examined the impact of remediation in Texas, a state which, like Florida, has a single placement exam and a single cutoff score for each subject tested—math, reading, and writing. Using a research design that is similar to the basic model of the study reported on here, the authors exploited information on college students' remedial placement exam scores to compare students just above and just below the placement cutoff. They found that remediation had little effect on a wide range of educational and labor market outcomes. Their estimates are small and statistically insignificant, but they suggest that students are neither harmed nor greatly benefited by remediation.

The results of these studies provide conflicting evidence, with positive effects found in Ohio and a lack of any effects found in Texas. Beyond the studies of these two states, little is known about the causal impact of remedial courses on underprepared students.

Postsecondary Remediation in Florida

All first-time, degree-seeking applicants for admission to community colleges and state universities in Florida must be tested before registration to demonstrate certain basic skills before beginning college-level courses. Basic skills are measured using standardized test scores on the Florida College Entry Level Placement Test (CPT). The CPT is a computer adaptive college placement testing program and is part of the Accuplacer system, developed by the College Board at the request of the Florida Department of Education. Students must meet certain statewide cutoff scores set by the State Board of Education in order to be considered "college ready." Incoming students whose test results fall below statewide cutoff scores on the elementary algebra, reading comprehension, and sentence skills sections of the placement test must take remedial classes before they begin college-level work in each subject. Colleges may exempt students from taking the CPT if scores earned on the SAT or ACT indicate college readiness.

Dataset and Method

To examine the impact of remediation in this context, the present study used a comprehensive dataset obtained from the Florida Department of Education that covers all first-time community college students who enrolled at any of the state's 28 community colleges from fall 1997 to fall 2000, reported CPT scores, and sought at least an associate degree. The data include information on test scores and demographic characteristics, including age, gender, race/ethnicity, citizenship, previous education (high school diploma, other diploma, or GED), and English language proficiency.

The study defined its main variables of interest—assignment to remediation and participation status—using test scores and longitudinal information on remedial education courses taken by subject (math and reading). The dataset tracked term-by-term enrollment for all students in the sample for a total of six years. For example, students who began in fall 2000 were tracked until spring 2006, for a total of 17 terms (fall, spring, and summer). The study investigated short-term outcomes, such as students' enrollment and completion of the first college-level course in the remediation area (college algebra and freshman English composition) and students' fall-to-fall persistence. It also investigated long-term outcomes, such as completion of a certificate, completion of an associate degree, and transfer to the state university system of Florida. Two additional measures of educational attainment were also investigated: total credits earned (remedial and non-remedial) and total college-level credits earned (non-remedial).

The study used a regression discontinuity (RD) design, which exploits the fact that remedial placement in Florida is largely based on a test score. This quasi-experimental design compares students just above the statewide cutoff score (who do not enroll in remedial education) with those just below the score (who do enroll in remedial education), assuming that this sample of students close to the cutoff is academically equivalent due to some randomness in testing process outcomes around the discontinuity. Because both groups are similar at the baseline, any difference in their educational outcomes can be credibly attributed to participation in remediation.

It is important to note that while the CPT exam is the statewide required tool to assign remediation, the data suggest that all students do not follow the straightforward assignment rules, and this reality has important implications for the statistical analysis. A second concern is that students at some institutions may take the CPT multiple times

to increase their chances of passing it. Retesting could thus result in nonrandom sorting around the policy cutoff, which also has implications for this and other research that utilizes the RD method. The researchers involved in the study developed techniques to deal with these concerns. First, to address the issue of assignment noncompliance, the researchers combined the RD design with an instrumental variable strategy that uses the exogenous determination of assignment as an instrument for enrollment in remediation. Second, to address the issue of retesting, the researchers used a method proposed by McCrary (2008) to identify institutions with no statistical evidence of endogenous sorting around the cutoff. These techniques are discussed in detail in the full report of the study.

Study Findings and Limitations

Results of the study suggest that as a means for addressing the needs of underprepared students, remediation has both benefits and drawbacks. After controlling for noncompliance and endogenous sorting around the placement test cutoff score, students on the margin of requiring math remediation were slightly more likely to persist to their second year, with estimates suggesting a 2.0 to 3.8 percentage point difference. Similarly, the impacts of both math and reading remediation were positive in terms of the total (remedial and college-level) credits earned over six years. Estimates suggest that students in math and reading remediation earned 7.2 and 2.8 more credits than non-remedial students, respectively. However, no effect was found on total college-level (non-remedial) credits completed. Meanwhile, the likelihood of passing subsequent college-level English composition was slightly lower for reading remedial students, while no difference was found in future math course performance for math remedial students. No discernable impact was found in terms of certificate or associate degree completion or transfer to a public four-year college. Overall, the results suggest that remediation might promote early persistence in college, but it does not necessarily help students who are on the margin of passing the cutoff make progress toward a degree.

By studying a large, diverse student group and providing information on several outcomes not previously examined, this study provides a broad perspective on the impacts of remediation, and it helps reconcile some of the mixed results found in other causal studies. Although much more positive effects were found in Ohio (Bettinger & Long, 2009), the present study also found that remediation appears to increase student

persistence. Yet, like the study on students in Texas (Martorell & McFarlin, 2008), the present study suggests that this increased persistence has only a minimal impact on degree completion. It is worth noting that the differences in effects that exist across these studies may be partly due to the different student populations under analysis. For example, this study includes nearly the entire universe of first-time, degree-seeking students in Florida, while Bettinger and Long (2009) focused on traditional-age college students who were allowed to complete their remediation at either two- or four-year public institutions. Further, states differ in where they locate the cutoff for placement in remediation, and these differences are likely to generate slightly different populations of “students on the margin of passing the cutoff.” As all three of these studies (on Florida, Ohio, and Texas) focus on such students, differences in the cutoff could potentially explain differences found in the results.

It is also important to recognize that the research design in this study allows for the identification of the effect of remediation on only that subset of students who scored just above and just below the cutoff score. Estimates should not be extrapolated to students with academic skills so weak that they scored significantly below the cutoff point. Moreover, this analysis is a “black box” evaluation of the effectiveness of remediation in Florida. Successful specific remediation programs might exist at certain institutions in the state, but the data used in this study do not contain the necessary information to link remedial students to specific interventions.

Policy Implications

The study reported here provides a comprehensive evaluation of postsecondary remediation in a large, important state system that reflects broader national trends in remediation policy and student diversity. While remedial education is a major investment at many colleges and universities, the literature provides very little information about the causal impact of remedial courses, and much of the recent evidence has been mixed. The results found in this study suggest that the costs of remediation should be given careful consideration in light of the limited benefits estimated for students at the margin of needing the courses. While there may be an initial return in terms of the increased likelihood of persistence, remediation was not found to improve longer term outcomes such as degree completion. Yet, because even a year of college without completing a degree does have some return, the investment in remediation may nonetheless be beneficial. What is more,

remediation may give colleges the opportunity to reach students with other types of programming and skill development that are valuable. Additional research is needed to carefully examine the full scope of costs and benefits.

The results of this study also have important policy implications for the institutional implementation of remedial placement procedures. The findings provide evidence that while a state may have a common placement exam and statewide cutoff score, the actual implementation of such a policy could differ at the institutional level. In the case of Florida, mandated assignment to remedial courses and actual remedial enrollment rates differed at most institutions, especially below the cutoff. A surprising number of students with assessment scores below those necessary to be exempt from remediation did not in fact enroll in remedial courses; instead they directly entered college-level courses in the relevant fields.

State systems should explore this issue of noncompliance and consider its potential consequences. States may want to create better mechanisms to enforce statewide placement rules at each institution. Alternatively, policymakers could reconsider whether the current set of placement cutoffs accurately reflects the level of preparedness that institutions deem necessary for student success in college-level coursework. Given the evidence presented in this study, it may be the case that students who do not comply with the placement policy are actually saving themselves the costs of remediation while losing little in long-term benefits. By examining institutional practices more closely, states might better decide whether to focus time and resources on enforcing compliance or on reconsidering the remediation courses or affiliated programs offered to underprepared students.

This study also documents the fact that retesting practices are not standard across the state nor even across remedial subject areas (retesting is more common for reading). The likelihood of allowing a student to retake the placement exam differs substantially by institution and background. As a result, the ability to routinely retest students at some institutions may threaten the validity of the exam as a tool for accurate placement. Moreover, an institutional policy that allows retests effectively lowers the relevant cutoff score and thereby weakens the exam’s original intent. To deal with this concern, states should consider explicit rules for retesting. In addition, to enable assessment of the implications of retesting policies, they should include in their databases information on all placement test scores, the number of tests taken, and the time elapsed between each test.

While this study has extended the research on postsecondary remediation, additional effort is needed to estimate the impact of remedial courses on weaker students who score far below the placement cutoff necessary to take college-level courses. More work is also needed on the effects of remediation relative to its costs. In addition, future research should also focus on institutional policies and practices, as well as particular services and classroom strategies, in order to explore differences in the effects of remediation by college and by remediation program design. It would be extremely useful to identify institutional characteristics and innovative approaches that appear to increase the success of remedial students and evaluate them using rigorous research designs.

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